Statement of Basis

Title V Air Quality Permit Renewal

Otter Tail Power Company – Big Stone I and II

Big Stone City, South Dakota

South Dakota Department of Environment and Natural Resources

TABLE OF CONTENTS

Page

1.0 Title V Air Quality Permit Renewal

On February 24, 1997, Otter Tail Power Company was issued its initial Title V air quality permit to operate the Big Stone I power plant. The Big Stone I power plant converts steam to electricity by burning subbituminous coal and other approved alternative fuels and wastes.

In accordance with permit condition 5.2 of Otter Tail Power Company's Title V air quality permit, if the renewal application is submitted six months prior to the expiration of the Title V air quality permit, Otter Tail Power Company may continue to operate under the terms of the expired permit until the South Dakota Department of Environment and Natural Resources (DENR) takes final action on the renewal application.

On June 4, 2001, Otter Tail Power Company submitted an application to renew Big Stone I's Title V air quality permit. Otter Tail Power Company submitted the application on behalf of the three co-owners: Montana Dakota Utilities, Northwestern Energy, and Otter Tail Power Company. The renewal application was submitted approximately eight months prior to the permit expiring on February 24, 2002. Therefore, the renewal application was submitted in a timely manner and Otter Tail Power Company may continue to operate under the existing permit until DENR acts on the permit renewal application.

On March 21, 2007, DENR issued a permit to Otter Tail Power Company to replace the advanced hybrid particulate collector with a baghouse. Otter Tail Power Company has completed that conversion.

On July 16, 2007, Otter Tail Power Company informed DENR that the facility no longer requests to burn PCB oil, non-PCB oil, and non-detectable PCB oil. In addition, Otter Tail Power Company requests all corresponding permit conditions be omitted from the permit.

1.1 Existing Permitted Equipment

The following equipment was derived from Otter Tail Power Company's existing Title V air quality permit:

Unit #1 1975 Babcock & Wilcox Company balanced draft, cyclone-fired steam generator that is used to produce electricity and provide steam to an ethanol plant. The boiler that provides steam to the turbine has a maximum operating rate of 5,609 million Btus per hour heat input. Air emissions from the unit are controlled by an advanced hybrid particulate collector or a Buell baghouse. The Buell baghouse may be installed during the term of this permit. A flue gas conditioning agent may be used to help control particulate and opacity emissions. Unit #1 is fired mainly with subbituminous coal. Alternative fuels and wastes that are approved to be burned in Unit #1 are listed in permit condition 4.1;

Unit #2 1973 Combustion Engineering auxiliary steam boiler, Model #31-A-14. The auxiliary steam boiler has a maximum design operating rate of 150,000 pounds of steam per hour and is fired with #2 fuel oil and non-detectable polychlorinated biphenyl oil.

The auxiliary steam boiler is not equipped with air pollution control equipment to reduce emissions;

Unit #3 1961 Bros steam heating boiler, Model #461-03. The steam heating boiler has a maximum design operating rate of 98 million Btus per hour and is fired with #2 fuel oil and non-detectable polychlorinated biphenyl oil. The steam heating boiler is not equipped with air pollution control equipment to reduce emissions;

Unit #4 1974 Waukesha Power Systems emergency diesel generator, Model #VHP5900 DSIU. The emergency diesel generator has a maximum design operating rate of 1,000 kilowatts and is fired with #2 fuel oil and non-detectable polychlorinated biphenyl oil. The emergency generator is not equipped with air pollution control equipment to reduce emissions;

Unit #5 Live fuel storage building, transfer point. The maximum design operating rate is 3,000 tons per hour. The dust emissions generated from this operation are controlled by a 1974 Ray Jet Fabric Filter System pulse jet baghouse containing 96 bags. The baghouse is scheduled to be replaced during the term of this permit;

Unit #6 Rotary car dumper conveyor. The maximum design operating rate is 3,000 tons per hour. The dust emissions generated from this operation are controlled by a 1974 Ray Jet Fabric Filter System pulse jet baghouse containing 144 bags. The baghouse is scheduled to be replaced during the term of this permit;

Unit #7 Rotary car dumper building. The maximum design operating rate is 3,000 tons per hour. The dust emissions generated from this operation are controlled by four 1974 Ray Jet Fabric Filter System pulse jet baghouses containing 360 bags each;

Unit #8 Fuel transfer house. The maximum design operating rate is 1,100 tons per hour. The dust emissions generated from this operation are controlled by 1995 Air-Cure pulse jet baghouse containing 168 bags;

Unit #9 North fuel conveying system and silo vents. The maximum design operating rate is 550 tons per hour. The dust emissions generated from this operation are controlled by a 1974 Ray Jet Fabric Filter System pulse jet baghouse containing 168 bags. The baghouse is scheduled to be replaced during the term of this permit;

Unit #10 South fuel conveying system, silo vents, and plant distribution bin. The maximum design operating rate is 550 tons per hour. The dust emissions generated from this operation are controlled by a 1974 Ray Jet Fabric Filter System pulse jet baghouse containing 192 bags. The baghouse is scheduled to be replaced during the term of this permit;

Unit #11 Fly ash storage silo. The maximum design operating rate is 19 tons per hour. The dust emissions generated from this operation are controlled by a 1974 W.W. Sly Manufacturing Company reverse air baghouse containing 96 bags; and

Unit #12 Lime storage silo. The maximum loading rate is 15 tons per hour. The dust emissions generated from this operation are controlled by a 2001 Chemical Metering System baghouse, Model #17-04, containing 44 bags.

Otter Tail Power Company has requested to burn biodiesel in Unit #2, #3, and #4.

1.2 Big Stone II Permitted Equipment

On July 20, 2005, Otter Tail Power Company submitted an application for an air quality preconstruction permit under the Prevention of Significant Deterioration (PSD) program on behalf of the co-owners of Big Stone II. Big Stone II will be located on the same property as Big Stone I. In the Big Stone II PSD application, Otter Tail Power Company requested emission and operational limits that are associated with both Big Stone I and Big Stone II to avoid a PSD review for sulfur dioxide and nitrogen oxide emissions. Otter Tail Power Company supplemented its application with additional supporting material. During the public notice period on the PSD draft permit, there were comments associated with including emission and operational limits on both power plants in the PSD draft permit. In this case, DENR concluded that the Title V air quality permit was a more appropriate place for those types of limits.

A review of the new process equipment for the Big Stone II project in the Title V air quality permit renewal process is limited to the new equipment that emits sulfur dioxide and nitrogen oxide emissions and the operational limits necessary for the Big Stone II project to avoid a PSD review for sulfur dioxide and nitrogen oxide. The applicable state and federal requirements for the equipment associated with Big Stone II will be covered under the PSD permit. In addition, the existing units associated with Big Stone I that are being modified to accommodate Big Stone II will also be reviewed. The following equipment is associated with Big Stone II project and will be permitted under the Title V air quality permit for Big Stone I:

Unit #7 Rotary car dumper building. The operating rate will increase from a maximum design operating rate of 3,000 tons per year to a design rate of 3,600 tons per hour. Four baghouses will control the air emissions.

Unit #13 Super-critical pulverized coal-fired boiler and steam turbine generator. The boiler provides steam to the turbine at 6,000 million Btus per hour heat input[1]. The boiler will be fired by subbituminous coal, ultra low sulfur diesel, or biodiesel. The super-critical pulverized coal fired boiler will be equipped with low NOx burners. A baghouse, wet flue gas desulfurization, and selective catalytic reduction will be installed to control air emissions;

Unit #14 Fire pump with an operating rate of 420 horsepower heat output[1]. The fire pump will be fired by ultra low sulfur diesel and biodiesel. A catalyzed diesel particulate filter will be installed to control air emissions. In addition, Otter Tail Power Company proposes an operational limit of 500 hours per 12-month period for this unit;

Unit #15 Electric generator with an operating rate of 2,220 kilowatts heat output[1]. The generator will be fired by ultra low sulfur diesel and biodiesel. A catalyzed diesel particulate filter will be installed to control air emissions. In addition, Otter Tail Power Company proposes an operational limit of 500 hours per 12-month period for this unit;

Unit #25 Boiler booster pump with an operating rate of 225 horsepower heat output[1]. The pump will be fired by ultra low sulfur diesel and biodiesel. A catalyzed diesel particulate filter will be installed to control air emissions. In addition, Otter Tail Power Company proposes an operational limit of 500 hours per 12-month period for this unit; and

Unit #33 Coal area booster pump with an operating rate of 225 horsepower heat output[1]. The pump will be fired by ultra low sulfur diesel and biodiesel. A catalyzed diesel particulate filter will be installed to control air emissions. In addition, Otter Tail Power Company proposes an operational limit of 500 hours per 12-month period for this unit.

[1] – The operating rate is the nominal or manufacturer listed operating rate noted in the PSD application

Particulate matter, carbon monoxide, volatile organic compound, and mercury emissions from the new equipment for Big Stone II and the existing equipment being modified to accommodate Big Stone II will be addressed in the Prevention of Significant Deterioration permit.

1.3 Removal of Existing Equipment

As noted in the PSD application and specifically identified in a letter dated March 12, 2007, Otter Tail Power Company proposes to remove Unit #5 and #6 from the permit once the Big Stone II project is constructed and begins operation.

1.4 Insignificant Activities

In accordance with Administrative Rules of South Dakota (ARSD) 74:36:05:04.01, the application listed several pieces of equipment and processes that Otter Tail Power Company considers insignificant activities. The equipment and processes listed in the application and the appropriate reference to the ARSD may be viewed in Table 2-1.

Table 2-1 – List of Insignificant Activities

Description	**Exemption Reference**
Big Stone I Emergency fire pump	ARSD 74:36:05:04.01(4)
Electric and Oxy/Acetylene welding units	ARSD 74:36:05:04.01(6)
Dozer, front end loaders, etc.	ARSD 74:36:05:04.01(2)
Painting, paving, re-tarring roofs, etc.	ARSD 74:36:05:04.01(6)
Precipitator building cleaning	ARSD 74:36:05:04.01(6)
Parts washer solvent	ARSD 74:36:05:04.01(6)
Building ventilation system	ARSD 74:36:05:04.01(5)
Storage Tanks 2 – 2,000 gallons tanks 1 – 1,000 gallon tank 1 – 275 gallon tank 1 – 265 gallon tank 6 – ~ 10,000 gallon tanks 1 – 527,940 gallon tank	ARSD 74:36:05:04.01(7)

Description	Exemption Reference
Coal and ash spill cleanup	ARSD 74:36:05:04.01(6)
Portable pump, welders, or other devices	ARSD 74:36:05:04.01(4)
Alternative fuel handling	ARSD 74:36:05:04.01(7)
Portable fuel-fired heaters	ARSD 74:36:05:04.01(4)

2.0 Permit Requirements

2.1 New Source Review

ARSD 74:36:10:01 notes that new source review regulations apply to areas of the state which are designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. Big Stone I and the proposed Big Stone II are located near Big Stone City, South Dakota, which is in attainment for all the pollutants regulated under the Clean Air Act and not subject to new source review.

2.2 Prevention of Significant Deterioration

2.2-1 Big Stone I

The original Prevention of Significant Deterioration (PSD) rules in effect prior to March 1, 1978, were published in the Federal Register on December 5, 1974. These rules applied to the following 17 specific source categories and were constructed after June 1, 1975:

1. Fossil-Fuel Steam Electric Plants of more than 1,000 million Btus;
2. Kraft Pulp Mills;
3. Portland Cement Plants;
4. Primary Zinc Smelters;
5. Iron and Steel Mills;
6. Primary Aluminum Ore Reduction Plants;
7. Primary Copper Smelters;
8. Municipal Incinerators capable of charging more than 250 tons of refuse per 24 hour day;
9. Sulfuric Acid Plants;
10. Petroleum Refineries;
11. Lime Plants;
12. Phosphate Rock Processing Plants;
13. By-Products Coke Oven Batteries;
14. Sulfur Recovery Plants;
15. Carbon Black Plants;
16. Primary Lead Smelters; and
17. Fuel Conversion Plants.

Big Stone I is considered a fossil-fuel electric plant of more than 1,000 million Btus, which is one of the 17 named PSD source categories. However, Big Stone I commenced construction

prior to June 1, 1975, and was not required to obtain a PSD permit under the original PSD rules.

Under the current PSD rules, a PSD review applies to new major stationary sources and major modifications to existing major stationary sources in areas designated as attainment under Section 107 of the Clean Air Act for any regulated pollutant. The following is a list of regulated pollutants under the PSD program:

- Total suspended particulate matter (TSP);
- Particulate matter 10 microns in diameter or less (PM10);
- Particulate matter 2.5 microns in diameter or less (PM2.5);
- Sulfur dioxide (SO_2);
- Nitrogen oxides (NOx);
- Carbon monoxide (CO);
- Ozone – measured as volatile organic compounds (VOCs);
- Lead;
- Fluorides;
- Sulfuric acid mist;
- Hydrogen sulfide;
- Reduced sulfur compounds; and
- Total reduced sulfur.

If the source is considered one of the 28 named PSD source categories listed in Section 169 of the federal Clean Air Act, the major source threshold is 100 tons per year of any regulated pollutant. The major source threshold for all other sources is 250 tons per year of any regulated pollutant.

Big Stone I is considered a fossil fueled boiler with a heat input greater than 250 million Btus per hour, which is one of the 28 named PSD source categories. Although Big Stone I has the potential to emit greater than the major source threshold under the PSD program, construction of Big Stone I commenced prior to August 7, 1977. Therefore, Big Stone I was not required to obtain a PSD permit under the current PSD rules.

2.2-2 Lime Storage Silo

On June 22, 2001, Otter Tail Power Company's Title V air quality permit was modified to include a lime silo (Unit #12). The potential uncontrolled emissions of particulate matter from this new unit were greater than the significant threshold for particulate matter 10 microns in diameter or less (PM10) under the PSD program. However, the potential controlled emissions of PM10 were less than two tons per year. Otter Tail Power Company accepted operational restrictions to maintain its actual PM10 emissions from Unit #12 below the significant threshold.

The operational restrictions that were in the existing Title V air quality permit must be included in the Title V air quality permit renewal. In addition, a short term PM10 emission limit of 0.01 grains per dry standard cubic foot will be included to ensure the significant threshold of 15 tons

per year is not exceeded.

2.3 New Source Performance Standards

DENR reviewed the New Source Performance Standards (NSPS) and determined that the following may be applicable:

2.3-1 ARSD 74:36:07:02 – 40 CFR, Part 60, Subpart D

The provisions of the standards of performance for fossil fuel-fired steam generators are applicable to the following:

1. Each fossil fuel-fired steam generating unit of more than 250 million Btus heat input; or
2. Each fossil fuel-fired and wood residue fired steam generating unit of more than 250 million Btus heat input; and
3. Commences construction, modification, or reconstruction after August 17, 1971.

Otter Tail Power Company currently operates three boilers (Unit #1, #2, #3) as part of the Big Stone I power plant. Unit #1 is considered a steam generating unit with a maximum design heat input capacity equal to or greater than 250 million Btus per hour. Otter Tail Power Company commenced construction of Unit #1 on January 18, 1971, as noted in EPA's September 5, 1972, letter to Otter Tail Power Company. Therefore, Unit #1 is not applicable to this new source performance standard.

Unit #2 and #3 do not have a maximum design heat input capacity equal to or greater than 250 million Btus per hour. Therefore, Unit #2 and #3 are not applicable to this new source performance standard.

2.3-2 ARSD 74:36:07:03 – 40 CFR, Part 60, Subpart Da

The provisions of the standards of performance for electric utility steam generators are applicable to the following:

1. Each electrical steam generating unit of more than 250 million Btus heat input; and
2. Commences construction, modification, or reconstruction after September 18, 1978.

Otter Tail Power Company currently operates one electric utility steam generator (Unit #1) as part of the Big Stone I power plant. Otter Tail Power Company commenced construction on Unit #1 prior to September 18, 1978. Therefore, Unit #1 is not applicable to this new source performance standard.

2.3-3 ARSD 74:36:07:12 – 40 CFR, Part 60, Subpart K

The provisions of the standards of performance for storage vessels of petroleum liquids constructed after June 11, 1973, and before May 19, 1978, are applicable to each storage vessel of petroleum liquids for which:

1. Construction commenced after June 11, 1973;
2. Construction commence before May 19, 1978; and
3. Tank capacity is 40,000 gallons or greater.

Otter Tail Power Company has 12 storage tanks of variable sizes. Eleven of the 12 storage tanks have a capacity equal to or less than 10,000 gallons. Therefore, these 11 storage tanks are not applicable to this new source performance standard.

Otter Tail Power Company's largest tank is 528,000 gallons and stores distillate oil. Under the definition for petroleum liquids, fuel oils #2 through #6 (distillate and residual oil) and diesel fuels #2D and #4D are not considered a petroleum liquid in regards to this new source performance standard. Therefore, this storage tank is not applicable to this new source performance standard.

2.3-4 ARSD 74:36:07:13 – 40 CFR, Part 60, Subpart Ka

The provisions of the standards of performance for storage vessels of petroleum liquids constructed after May 18, 1978, and before July 24, 1984, are applicable to each storage vessel of petroleum liquids for which:

1. Construction commenced after May 18, 1978;
2. Construction commence before July 24, 1984; and
3. Tank capacity is 40,000 gallons or greater.

Otter Tail Power Company has 12 storage tanks of variable sizes. Eleven of the 12 storage tanks have a capacity equal to or less than 10,000 gallons. Therefore, these 11 storage tanks are not applicable to this new source performance standard.

Otter Tail Power Company's largest tank is 528,000 gallons and stores distillate oil. Otter Tail Power Company commenced construction on this tank prior to May 18, 1978. Therefore, this tank is not applicable to this new source performance standard.

2.3-5 ARSD 74:36:07:14 – 40 CFR, Part 60, Subpart Kb

The provisions of the standards of performance for storage vessels of petroleum liquids constructed after July 24, 1984, are applicable to each storage vessel of petroleum liquids for which:

1. Construction commenced after July 24, 1984; and
2. Tank capacity is 75 cubic meters (~19,800 gallons) or greater.

Otter Tail Power Company has 12 storage tanks of variable sizes. Eleven of the 12 storage tanks have a capacity equal to or less than 10,000 gallons. Therefore, these 11 storage tanks are not applicable to this new source performance standard.

Otter Tail Power Company's largest tank is 528,000 gallons and stores distillate oil. Otter Tail Power Company commenced construction on this tank prior to July 24, 1984. Therefore, this tank is not applicable to this new source performance standard.

2.3-6 ARSD 74:36:07:16 – 40 CFR Part 60, Subpart Y

The provisions of the standards of performance for coal preparation plants are applicable to the following units and processes in coal preparation plants that commence construction or modifications after October 24, 1974: thermal dryers, pneumatic coal cleaning equipment, coal processing and conveying equipment, coal storage systems, and coal transfer and loading systems.

Otter Tail Power Company commenced construction on the Big Stone I power plant prior to October 24, 1974. Therefore, the coal handling systems is not applicable to this new source performance standard.

As part of the Big Stone II project, Unit #7 will be physically changed and have the potential to increase the hourly emission rate. Therefore, Unit #7 will have been modified after October 24, 1976. At the time the modifications are implemented, this unit will become applicable to this new source performance standard. Since Unit #7 is used to provide coal to both Big Stone I and II, this new source performance standard is applicable to both the Title V air quality permit for Big Stone I and the PSD air quality permit for Big Stone II.

2.3-7 ARSD 74:36:07:07 – 40 CFR, Part 60, Subpart Ea

The provisions of the standards of performance for municipal waste combustors for which construction commenced after December 20, 1989, and on/or before September 20, 1994, are applicable to each municipal waste combustor for which:

1. The unit has a capacity greater than 225 megagrams per day (250 tons per day) of municipal solid waste;
2. Construction commenced after December 20, 1989, and on/or before September 20, 1994; and
3. Modification or reconstruction commenced after December 20, 1989, and on/or before June 19, 1996.

Otter Tail Power Company originally did not burn municipal solid waste. Since then Otter Tail Power Company has received approval to burn a variety of alternative fuels, including municipal solid waste. During the approval process for burning municipal solid waste, Otter Tail Power Company requested that Unit #1 be considered a co-fired combustor. Co-fired combustors are

not applicable to this subpart.

Under 40 CFR § 60.51a, a co-fired combustor is defined as a unit combusting municipal solid waste with non-municipal solid waste fuel (e.g., coal) and subject to an enforceable limit on the unit to combust a fuel feed stream, 30 percent or less of the weight of which is comprised, in aggregate, of municipal solid waste as measured on a calendar quarterly basis. Otter Tail Power Company will be required to meet the requirements for a co-fired combustor as defined in 40 CFR §60.51a.

Municipal solid waste does not include used oil; sewage sludge; wood pallets; construction; renovation; and demolition wastes (which includes but is not limited to railroad ties and telephone poles); clean wood; industrial process or manufacturing wastes; medical waste; or motor vehicle (including motor vehicle parts or vehicle fluff); and a single item waste stream of tires. Table 2-1 lists the types of alternative fuels and wastes that Otter Tail Power Company may burn in Unit #1 and if those fuels or wastes are considered a municipal solid waste.

Table 2-1 – Approved Alternative Fuels and Wastes Considered Municipal Solid Waste

Type of Fuel	**Municipal Solid Waste**	**Reason**
Lignite coal	No	Not considered a waste
Agricultural crop residue and waste seeds	No	Considered an industrial or manufacturing waste
Distillate oil	No	Not considered a waste
Tire derived fuel	No	Considered a single item waste stream of tires
Refuse derived fuel	Yes	
Waste toner powder	No	Considered an industrial or manufacturing waste
Trees and natural wood	No	Considered a clean wood
Used oil and solvents (on-site generated)	No	Considered a used oil, which is an industrial or manufacturing waste
Plastic chips	No	Considered an industrial or manufacturing waste
Granulated insulation	No	Considered an industrial or manufacturing waste
Gasket and “O” rings	No	Considered an industrial or manufacturing waste
Manufactured wood waste containing formaldehyde resins and materials	No	Considered an industrial or manufacturing waste
Tube forms	No	Considered an industrial or manufacturing waste
Rubber belting	No	Considered an industrial or manufacturing waste
Petroleum coke	No	Not considered a waste

Type of Fuel	Municipal Solid Waste	Reason
Oil filters (on-site generated)	No	Considered an industrial or manufacturing waste
Chipped wood treated with copper arsenate and pentachlorophenol	No	Considered an industrial or manufacturing waste
Boiler steam side cleaning waste	No	Considered an industrial or manufacturing waste
Floor dry, diatomaceous earth, dirt, sorbent debris containing non-PCB oil	No	Considered an industrial or manufacturing waste
Evaporative brine concentrator supernatant	No	Considered an industrial or manufacturing waste

2.3-8 40 CFR, Part 60, Subpart HHHH

The emission guideline for coal fired electric steam generating units is applicable to a stationary coal-fired boiler or stationary coal-fired combustion turbine that has a nameplate capacity greater than 25 megawatts.

Otter Tail Power Company currently operates one coal fired electric steam generating unit (Unit #1) as part of the Big Stone I power plant. Unit #1 has a nameplate capacity greater than 25 megawatts. Therefore, 40 CFR, Part 60, Subpart HHHH is applicable to Unit #1.

2.3-9 40 CFR, Part 60, Subpart IIII

The standard of performance for stationary compression ignition internal combustion engines was finalized on July 11, 2006. This subpart is applicable to each stationary compression ignition internal combustion engine that commenced construction, modification, or reconstruction after July 11, 2005. Otter Tail Power Company commenced construction on the existing generator (Unit #4) and the existing fire pump, which is considered an insignificant activity, prior to July 11, 2005. Therefore, these two units are not applicable to this new source performance standard.

The new fire pump (Unit #14), the new generator (Unit #15), and the two new booster pumps (Unit #25 and #33) will be constructed after the applicability dates. Therefore, these units will be applicable to this new source performance standard.

2.4 National Emission Standards for Hazardous Air Pollutants

Presently, there are no finalized or promulgated National Emissions Standards for Hazardous Air Pollutants standards for the type of operations used by Big Stone I and the equipment being reviewed associated with Big Stone II.

2.5 Maximum Achievable Control Technology Standards

DENR reviewed the Maximum Achievable Control Technology standards and determined that the following may be applicable:

2.5-1 ARSD 74:36:08:11 – 40 CFR, Part 63, Subpart Q

This subpart prohibits the use of chromium based water treatment chemicals in industrial process cooling towers. Big Stone I does not use a cooling tower. Therefore, this subpart is not applicable to Big Stone I.

2.5-2 Case-by-Case MACT

On March 29, 2005, EPA issued a final rule in the federal register that removes coal and oil-fired electric utility steam generating units from the requirements of Section 112 of the federal Clean Air Act. Therefore, a Case-by-Case MACT review is not required.

2.6 Acid Rain Program

Unit #1 is subject to the Acid Rain Program. The requirements in the existing Title V air quality permit regarding the Acid Rain Program will be incorporated in the Title V air quality permit renewal.

2.7 State Requirements

Any source operating in South Dakota that meets the requirements of ARSD 74:36:05:03 is required to obtain a Title V air quality permit. Otter Tail Power Company's Big Stone I was required to apply for and obtain a Title V air quality permit because the potential uncontrolled emissions from the plant are greater than 100 tons per year for particulate matter less than 10 microns in diameter or less, sulfur dioxide, nitrogen oxide, carbon monoxide, and hazardous air pollutants. Big Stone I's status as a Title V air quality source has not changed.

2.7-1 Mercury Limit

Otter Tail Power Company has requested a plant wide mercury emission limit of 189 pounds per 12-month rolling period for both Big Stone I and II beginning 36 months following the commercial operation date of Big Stone II. The proposed limit would likely not take affect until the calendar year 2014 or 2015 at the earliest. This timeline takes into account approximately four years for construction of Big Stone II and the three years after commercial operation.

Otter Tail Power Company is required to meet the requirements in ARSD 74:36:19 – Mercury Budget Trading Program. This program takes affect in 2010 and is designed to reduce Mercury emissions by 70% nationally. Otter Tail Power Company will likely have to submit an application to renew the Title V permit prior to the proposed plant wide mercury limit would take affect and will have operated under the Mercury Budget Trading Program for about four to

five years. Therefore, DENR does not believe it is warranted to include this limit in the permit at this time.

2.7-2 Big Stone II Sulfur Dioxide and Nitrogen Oxide Exemptions

Otter Tail Power Company requested operational and emission limits that will maintain actual emissions of sulfur dioxide and nitrogen oxide at a certain level that will allow the Big Stone II project to forgo a PSD review for these two air pollutants. As noted in Otter Tail Power Company's PSD application for the Big Stone II project, Otter Tail Power Company proposes to install equipment that will control the sulfur dioxide and nitrogen oxide emissions from Unit #13 and has made an agreement with Big Stone I owners to reduce Big Stone I's sulfur dioxide and nitrogen oxide emissions. This will result in a zero net emission increase for both air pollutants.

A major modification occurs when the net emission increase exceeds the significant thresholds under the PSD program. For sulfur dioxide and nitrogen oxide, the significant threshold is 40 tons per year per pollutant. In accordance with 40 CFR § 52.21(b)(3), a net emission increase means the sum of the increases and decreases from the physical change(s) and actual emissions. In accordance with 40 CFR § 52.21(b)(48), baseline actual emissions means the rate of emissions, in tons per year as determined in accordance with 40 CFR § 52.21(b)(48)(i). For any existing electric utility steam generating unit, baseline actual emissions means the average rate, in tons per year, at which the unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 5-year period immediately preceding when the owner or operator begins actual construction of the project. DENR is allowed to use a different time period upon a determination that it is more representative of normal source operation.

Otter Tail Power Company proposed to use calendar years 2003 and 2004 for its two year average of Big Stone I's sulfur dioxide and nitrogen oxide emissions. Table 2-2 displays the sulfur dioxide and nitrogen oxide emissions and annual heat input values from 2000 through 2004. This information was obtained from the continuous emission monitoring system on Unit #1 as reported in Big Stone I's operational reports submitted to DENR and to EPA in accordance with the Acid Rain Program.

Table 2-2 – Big Stone I Sulfur Dioxide and Nitrogen Oxide Emission History

Year	Sulfur Dioxide (tons/year)	Nitrogen Oxide (tons/year)	Heat Input (MMBtus/year)
2000	13,258	16,899	40,236,712
2001	13,618	16,359	39,136,358
2002	11,756	14,856	35,753,697
2003	12,261	15,863	38,925,318
2004	14,296	17,033	41,250,513

In 2002, an extended period of outage was experienced when Otter Tail Power Company installed a hybrid baghouse/electrostatic precipitator to control particulate matter emissions. Therefore, 2002 is not representative of normal operations.

Calendar years 2003 and 2004 best represent sulfur dioxide and nitrogen oxide emissions in the last five years and will be accepted for determining the two year average from the Big Stone I facility. Table 2-3 displays the information used to determine the plant wide cap for sulfur dioxide.

Table 2-3 – Plant Wide Cap to Avoid PSD Review

Pollutant	2003 (tons/year)		2004 (tons/year)		2		Two-Year Average (tons/year)		Allowable Increase (tons/year)		Plant Wide Cap (tons/year)
Sulfur dioxide	12,261	+	14,296	÷	2	=	13,278	+	0	=	13,278
Nitrogen oxide	15,863	+	17,033	÷	2	=	16,448	+	0	=	16,448

A plant wide emission cap must be enforceable as a practical matter for Otter Tail Power Company to use the cap in determining if these pollutants are subject to a PSD program review. Therefore, the limits must be written so that it is possible to verify compliance and to document violations when enforcement action is necessary. The limits should be permanent, contain a legal obligation for the source to adhere to the terms and conditions, be technically accurate and quantifiable, identify an averaging time that allows at least monthly checks, and require a level of recordkeeping, reporting, and monitoring sufficient to demonstrate compliance with the limit.

Sulfur dioxide emissions from Unit #13 will be controlled by a wet flue gas desulfurization system. Otter Tail Power Company will connect the baghouse exhaust emissions from Unit #1 to the wet flue gas desulfurization system being installed on Unit #13. Otter Tail Power Company has indicated that they would like the ability to operate Unit #1 during periods when the wet flue gas desulfurization system is down for repairs or preventive maintenance. DENR will allow Otter Tail Power Company to continue to operate Unit #1 when the wet flue gas desulfurization system is shut down for repairs or preventative maintenance provided the plant wide sulfur dioxide emission limit is not exceeded. Unit #13 will be required to pass its exhaust gases through the wet flue gas desulfurization system at all times. When the wet flue gas desulfurization system is not operational, Unit #13 will be required to be shut down.

Nitrogen oxide emissions from Unit #13 will be controlled by a selective catalytic reduction unit. Nitrogen oxide emissions from Unit #1 will be controlled further by implementing operational changes at Big Stone I.

Unit #1 and #13 will be required to install, maintain, and operate continuous emission monitoring systems for sulfur dioxide and nitrogen oxide by the requirements under the Acid Rain Program and the new source performance standard for electric utility steam generators. Continuous emission monitoring systems are able to generate reliable data on an hourly basis for compliance demonstrations. Since the continuous emission monitoring systems will be able to provide quantifiable data on an hourly, monthly, and yearly basis, a short term or hourly emission limit is not warranted for demonstrating compliance with the sulfur dioxide and nitrogen oxide 12-month rolling limitation to forgo PSD.

A short term sulfur dioxide limit for Unit #2, #3, and #4 will be based on using low sulfur distillate oil or biodiesel with a sulfur content less than 0.05 percent by weight sulfur. The short term limit for Unit #14, #15, #25, and #33 will be based on using ultra low sulfur distillate oil or biodiesel with a sulfur content less than 0.0015 percent by weight sulfur. Compliance with the sulfur content limit will be based on fuel supplier certification and/or grab samples from the liquid fuel storage tanks.

A short term nitrogen oxide emission limit for Unit #2, #3, and #4 will be established at 0.17 pounds per million Btus heat input, 0.14 pounds per million Btus heat input, and 0.024 pounds per horsepower hour, respectively. These short term emission limits were derived from emission rates used in the Otter Tail Power Company's application for Big Stone II. The new source performance standard for stationary compression ignition internal combustion engine contains a nitrogen oxide plus non methane organic compound short term emission limit for Unit #14, #15, #25 and #33.

The plant wide cap for sulfur dioxide and nitrogen oxide emissions will be incorporated in the permit and is enforceable. The limitations are quantifiable; the permit will require testing to verify compliance with the emissions limits or verify that the continuous emission monitoring system meets performance specifications and quality assurance mechanisms; and require quarterly reporting of the monthly and 12-month rolling sulfur dioxide and nitrogen oxide emissions. Therefore, the Big Stone II project is not required to conduct a PSD review for sulfur dioxide and nitrogen oxide because its potential emission increases would be less than the significant rate of 40 tons per year per pollutant.

2.7-3 Big Stone I Particulate Emission Limits

In Otter Tail Power Company's PM10 modeling analysis required in the PSD application review for the Big Stone II project, Otter Tail Power Company took into account the PM10 emission limits for existing operations listed in Table 2-4.

Table 2-4 – Modeling PM10 Limits for Existing Units at Big Stone I

Unit	Description	Modeling Limit
#1	Boiler	0.26 pounds per million Btus
#2	Auxiliary boiler	0.01 pounds per million Btus
#3	Heating boiler	0.01 pounds per million Btus
#4	Generator	0.32 grams per horsepower-hour
#7	Rotary car dumper building	0.01 grains per standard cubic foot (filterable)
#8	Fuel transfer house	0.02 grains per standard cubic foot (filterable)
#9	North Fuel conveying system	0.01 grains per standard cubic foot (filterable)
#10	South fuel conveying system	0.01 grains per standard cubic foot (filterable)
#11	Fly ash storage silo	0.01 grains per standard cubic foot (filterable)
#12	Lime storage silo	0.01 grains per standard cubic foot (filterable)

The PM10 emission rates are relied on for Big Stone II to ensure the National Ambient Air Quality Standards and Prevention of Significant Deterioration increments are not exceeded. Therefore, these PM10 emission limits will be included in the Title V air quality permit and will be effective on and after the initial startup of Unit #13, except Unit #12. The emission limit for Unit #12 is effective on the date of permit issuance.

2.7-4 State Emission Limits

South Dakota has established total suspended particulate matter, sulfur dioxide, and opacity emission limits in ARSD 74:36:06. Total suspended particulate matter and sulfur dioxide allowable emission limits for each unit at Big Stone I are calculated based on the formulas in ARSD 74:36:06:02 and 74:36:06:03. Tables 2-5 and 2-6 list the allowable emission limits for total suspended particulate matter and sulfur dioxide, respectively.

Table 2-5 – Total Suspended Particulate Matter Limit

Unit	Description	Emission Limit
#1	Boiler	0.3 pounds per million Btu
#2	Auxiliary boiler	0.4 pounds per million Btu
#3	Heating boiler	0.4 pounds per million Btu
#4	Generator	0.6 pounds per million Btu
#5	Live fuel storage building	93 pounds per hour
#6	Rotary car dumper conveyor	93 pounds per hour
#7	Rotary car dumper building	93 pounds per hour
#8	Fuel transfer house	79 pounds per hour
#9	North Fuel conveying system	70 pounds per hour
#10	South fuel conveying system	70 pounds per hour
#11	Fly ash storage silo	29 pounds per hour
#12	Lime storage silo	25 pounds per hour

Table 2-6 – Sulfur Dioxide Limit

Unit	Description	Emission Limit
#1	Boiler	3 pounds per million Btu
#2	Auxiliary boiler	3 pounds per million Btu
#3	Heating boiler	3 pounds per million Btu
#4	Generator	3 pounds per million Btu

In accordance with ARSD 74:36:06:01, the state's total suspended particulate matter and sulfur dioxide emission limits are not applicable if a particulate matter and sulfur dioxide emission limit specified in ARSD 74:36:07 (New Source Performance Standard program) or in ARSD 74:36:09 (PSD program) are applicable.

Otter Tail Power Company's is obtaining a PSD permit for the Big Stone II project. In Big Stone II's PSD application, Otter Tail Power Company is proposing particulate matter for the proposed equipment. Therefore, on and after the initial startup of Unit #13 associated with Big

Stone II, Unit #7 will be required to meet a particulate matter emission limit under the PSD regulations and not be required to meet South Dakota's total suspended particulate limit.

The sulfur dioxide short term limits that will be established in the Title V air quality permit are more stringent than the state's sulfur dioxide emission limit of 3 pounds per million Btus. Therefore, the state's sulfur dioxide emission limit will no longer be applicable on and after the initial startup of Unit #13 for the existing units.

In accordance with ARSD 74:36:12:01, each unit associated with Big Stone I is applicable to a visible emission limit of a density less than 20 percent opacity.

2.7-5 Compliance Assurance Monitoring

Compliance assurance monitoring is applicable to permit applications received on or after April 20, 1998, from major sources applying for a Title V air quality permit. Otter Tail Power Company's renewal application was received after April 20, 1998. Therefore, compliance assurance monitoring is applicable to any unit that meets the following criteria:

1. The unit is subject to an emission limit or standard for the applicable regulated air pollutant;
2. The unit uses a control device to achieve compliance with any such emission limit or standard; and
3. The unit has potential uncontrolled emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.

As noted in 40 CFR § 64.2(b), compliance assurance monitoring does not apply to those emission limits and standards that are required under the following:

1. Proposed after November 15, 1990, pursuant to section 111 or 112 of the Clean Air Act;
2. Ozone protection requirements under Title VI of the Clean Air Act;
3. Acid Rain Program requirements pursuant to section 404, 406, 407(a), 407(b), or 410 of Clean Air Act;
4. Apply solely under an emissions trading program approved or promulgated under the Clean Air Act;
5. Emissions cap that meets the requirements specified in 40 CFR § 70.4(b)(12) or § 71.6(a)(13)(iii); and
6. Permit specifies a continuous compliance determination method.

The draft permit for Big Stone I has emission limits for the following regulated air pollutant: total suspended particulate matter, particulate matter 10 microns in diameter or less, sulfur dioxide, nitrogen oxide, mercury, and opacity. A continuous monitoring system will be installed on Unit #1 for opacity; sulfur dioxide; nitrogen oxide; and mercury emissions and Unit #13 for sulfur dioxide and nitrogen oxide. In addition, the sulfur dioxide, nitrogen oxide, and mercury emission limits for Unit #1 and the sulfur dioxide and nitrogen oxide emission limits for Unit

#13 are required by a new source performance standard that was revised and/or promulgated after November 15, 1990, pursuant to section 111 or 112 of the Clean Air Act and the Acid Rain Program. Therefore, compliance assurance monitoring is not required for sulfur dioxide, nitrogen oxide, mercury and opacity for Unit #1 and sulfur dioxide and nitrogen oxide for Unit #13.

Table 2-9 lists the units that do not have continuous emission monitoring systems for the regulated air pollutant; if the unit has air emissions greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source; if compliance assurance monitoring is applicable; and for what pollutants.

Table 2-9 – Compliance Assurance Monitoring Applicability

Unit	Description	Controlled?	>100 tons?	Pollutant Limit?	CAM Applicable?
#1	Main Boiler	Yes	Yes	PM10/opacity	**Yes**
#2	Auxiliary Boiler	No	No	PM10/opacity	No
		No	Yes	Sulfur dioxide	No
		No	Yes	Nitrogen oxide	No
#3	Heating Boiler	No	No	PM10/opacity	No
		No	Yes	Sulfur dioxide	No
		No	No	Nitrogen oxide	No
#4	Generator	No	No	PM10/opacity	No
		No	No	Sulfur dioxide	No
		No	Yes	Nitrogen oxide	No
#5	Fuel storage building	Yes	No	PM10/opacity	No
#6	Rotary car conveyor	Yes	Yes	PM10/opacity	**Yes**
#7	Rotary car building	Yes	Yes	PM10/opacity	**Yes**
#8	Fuel transfer house	Yes	Yes	PM10/opacity	**Yes**
#9	North fuel conveyer	Yes	Yes	PM10/opacity	**Yes**
#10	South fuel conveyer	Yes	Yes	PM10/opacity	**Yes**
#11	Fly ash storage silo	Yes	Yes	PM10/opacity	**Yes**
#12	Lime storage silo	Yes	Yes	PM10/opacity	**Yes**
#14	Fire pump	No	No	Sulfur dioxide	No
		No	No	Nitrogen oxide	No
#15	Generator	No	No	Sulfur dioxide	No
		No	Yes	Nitrogen oxide	No
#25	Boiler booster pump	No	No	Sulfur dioxide	No
		No	No	Nitrogen oxide	No
#33	Silo booster pump	No	No	Sulfur dioxide	No
		No	No	Nitrogen oxide	No

Otter Tail Power Company has chosen to monitor and record the pressure drop across the baghouse for Unit #6 through #12 as its compliance assurance monitoring for the PM10/opacity limits. In addition to the pressure drop and during periods when the pressure drop is out of the predetermined ranges, a periodic visible emission evaluation or performance test will be

required. Compliance assurance monitoring for PM10 emissions from Unit #1 will be based on periodic tests and the opacity monitor.

2.7-6 Periodic Monitoring

Periodic monitoring is required for each emission unit that is subject to an applicable requirement at a source subject to Title V of the federal Clean Air Act. Otter Tail Power Company is required to meet particulate, opacity, sulfur dioxide, nitrogen oxide, and mercury emission limits.

Continuous emission monitoring systems will be used to demonstrate compliance with opacity, sulfur dioxide, nitrogen oxide, and mercury emission limits for Unit #1 and #13. Periodic monitoring for PM10 emissions from Unit #1 will consist of periodic performance tests. Periodic monitoring for Unit #6, #7, #8, #9, #10, #11, and #12 will consist of pressure drop reading across the baghouse associated with each unit. In addition to the pressure drop and during periods when the pressure drop is out of the predetermined ranges, a periodic visible emission evaluation or performance test will be required. Therefore, no additional periodic monitoring will be required.

Unit #2, #3, #4, and #5 are subject to periodic monitoring for particulate matter and opacity. Periodic monitoring for the units may consist of visible emission readings, pressure drop readings for the appropriate control device, or implementation of a maintenance plan for the appropriate control device, etc. DENR typically requires sources subject to periodic monitoring for particulate matter and opacity limits to conduct periodic visible emission readings. A permit condition will be placed in the permit requiring Otter Tail Power Company to perform periodic visible emission readings on Unit #2, #3, #4, and #5.

Unit #2, #3, #4, #14, #15, #25, and #33 are subject to periodic monitoring for sulfur dioxide. The amount of sulfur in the fuel is proportional to the amount of sulfur dioxide that may be generated and emitted. Therefore, periodic monitoring will consist of monitoring the sulfur content of the fuel burned.

Unit #2, #3, #4, #14, #15, #25, and #33 are subject to periodic monitoring for nitrogen oxide. Periodic monitoring will consist of an initial stack test and periodic stack tests based on record keeping, reporting, and inspections.

2.8 Summary of Applicable Requirements

Otter Tail Power Company will be required to construct and operate within the requirements stipulated in the following regulations:

- ✓ ARSD 74:36:05 – Operating Permits for Part 70 Sources;
- ✓ ARSD 74:36:06 – Regulated Air Pollutant Emissions;
- ✓ ARSD 74:36:07 – New Source Performance Standards;
- ✓ ARSD 74:36:11 – Performance Testing;

- ✓ ARSD 74:36:12 – Control of Visible Emissions;
- ✓ ARSD 74:36:13 – Continuous Emission Monitoring Systems;
- ✓ ARSD 74:36:16 – Acid Rain Program;
- ✓ ARSD 74:36:19 – Mercury Budget Trading Program; and
- ✓ ARSD 74:37:01 – Air Pollution Control Program Fees.

3.0 Recommendation

Based on the information submitted in the air permit application, DENR recommends conditional approval of a Title V air quality permit for Big Stone I with operational limits that allow Big Stone II to be exempt from a PSD review for sulfur dioxide and nitrogen oxide emissions. Any questions pertaining to this permit recommendation should be directed to Kyrik Rombough, Natural Resources Engineering Director.